

THE INVENTION CLAIMED IS:

1. A bumper system for a motor vehicle, comprising:
a bumper beam; and
an energy-absorbing bracket connected to the bumper beam and adapted for connection to the motor vehicle, the bracket comprising a hollow energy-absorbing body having a first end and a second end, the bracket body defining a saddle shape between the first and second ends.
2. The bumper system of claim 1, further comprising opposing flanges extending from the first end of the bracket body and defining a mouth opening receiving the bumper beam.
3. The bumper system of claim 1, wherein the bracket body is adapted to deform during a collision involving the motor vehicle.
4. The bumper system of claim 1, wherein the bumper beam has a generally Σ -shaped cross section defined by substantially parallel top and bottom walls connected by a rear wall, the generally Σ -shaped cross section at least partially filled with an impact-absorbing foam material.
5. The bumper system of claim 1, further comprising opposing flanges extending from the second end of the bracket body and defining a mouth opening configured to receive a frame rail of the motor vehicle.
6. The bumper system of claim 1, wherein the bumper beam and bracket are formed of different materials.

7. The bumper system of claim 1, further comprising a pole impact protector connected to the bumper beam on an opposite side of the bumper beam from the bracket.

8. The bumper system of claim 7, wherein the pole impact protector comprises a hollow body defining an outward facing substantially concave surface adapted to accommodate impact energy resulting from a collision with a cylindrical object.

9. The bumper system of claim 8, wherein the pole impact protector body is at least partially filled with an impact-absorbing foam material.

10. The bumper beam of claim 8, wherein the pole impact protector body is formed of aluminum or steel.

11. A bumper system for a motor vehicle, comprising:
a bumper beam; and
an energy-absorbing bracket connected to the bumper beam and adapted for connection to the motor vehicle, the bracket comprising a hollow energy-absorbing body having a first end and a second end, the bracket body having a first cross sectional shape at the first end and transitioning to a second cross sectional shape at the second end.

12. The bumper system of claim 11, wherein the second cross sectional shape is different from the first cross sectional shape.

13. The bumper system of claim 11, wherein the first and second cross sectional shapes are substantially identical, with the second cross sectional shape rotated about 90° from the first cross sectional shape.

14. The bumper system of claim 11, wherein the first cross sectional shape is elongated along a first axis and the second cross sectional shape is elongated along a second axis, with the second axis rotated about 90° from the first axis.

15. The bumper system of claim 11, wherein the first and second cross sectional shapes are substantially oval, with the second cross sectional shape rotated about 90° from the first cross sectional shape.

16. The bumper system of claim 11, further comprising opposing flanges extending from the first end of the bracket body and defining a mouth opening receiving the bumper beam.

17. The bumper system of claim 11, wherein the bumper beam has a generally Σ -shaped cross section defined by substantially parallel top and bottom walls connected by a rear wall, the generally Σ -shaped cross section at least partially filled with an impact-absorbing foam material.

18. The bumper system of claim 11, wherein the bumper beam and bracket are formed of different materials.

19. The bumper system of claim 11, wherein the bumper beam and bracket are each formed of aluminum or steel.

20. The bumper system of claim 11, further comprising a pole impact protector connected to the bumper beam on an opposite side of the bumper beam from the bracket.

21. The bumper system of claim 20, wherein the pole impact protector comprises a hollow body defining an outward facing substantially concave surface adapted to accommodate impact energy resulting from a collision with a cylindrical object.

22. The bumper system of claim 21, wherein the pole impact protector body is at least partially filled with an impact-absorbing foam material.

23. The bumper beam of claim 21, wherein the pole impact protector body is formed of aluminum or steel.

24. An energy-absorbing bracket for use in a bumper system of a motor vehicle, comprising a hollow energy-absorbing body having a first end and a second end, the bracket body defining a saddle shape between the first and second ends adapted to deform during a collision involving the motor vehicle.

25. The energy-absorbing bracket of claim 24, further comprising opposing flanges extending from each of the first and second ends of the bracket body and defining mouth openings adapted to receive a bumper beam and a frame rail of the motor vehicle, respectively.

26. The energy-absorbing bracket of claim 24, wherein the bracket body is formed of aluminum or steel.

27. An energy-absorbing bracket for use in a bumper system of a motor vehicle, comprising a hollow energy-absorbing body having a first end and a second end, the bracket body having a first cross sectional shape at the first end and transitioning to a second cross sectional shape at the second end for accommodating impact energy during a collision involving the motor vehicle.

28. The energy-absorbing bracket of claim 27, wherein the second cross sectional shape is different from the first cross sectional shape.

29. The energy-absorbing bracket of claim 27, wherein the first and second cross sectional shapes are substantially identical, with the second cross sectional shape rotated about 90° from the first cross sectional shape.

30. The energy-absorbing bracket of claim 27, wherein the first cross sectional shape is elongated along a first axis and the second cross sectional shape is elongated along a second axis, with the second axis rotated about 90° from the first axis.

31. The energy-absorbing bracket of claim 27, wherein the first and second cross sectional shapes are substantially oval, with the second cross sectional shape rotated about 90° from the first cross sectional shape.

32. The energy-absorbing bracket of claim 27, further comprising opposing flanges extending from the first end of the bracket body and defining a mouth opening adapted to receive a bumper beam of the motor vehicle.

33. The energy-absorbing bracket of claim 27 wherein the bracket body is formed of aluminum or steel.

34. A pole impact protector for use in a bumper system of a motor vehicle, comprising a hollow body having a closed end defining an outward facing substantially concave surface adapted to accommodate impact energy resulting from a collision with a cylindrical object.

35. The pole impact protector of claim 34, the pole impact protector body comprising an open end opposite the closed end, and further comprising opposing flanges extending from the open end for mounting the pole impact protector to the bumper system.

36. The pole impact protector of claim 34, wherein the pole impact protector body is at least partially filled with an impact-absorbing foam material.

37. The pole impact protector of claim 34, wherein the pole impact protector body is formed of aluminum or steel.

38. A method of assembling and attaching a bumper system to a motor vehicle, comprising:

providing an energy-absorbing bracket comprising a hollow energy-absorbing body having a first end and a second end, the bracket body defining a saddle shape between the first and second ends, the bracket body further comprising opposing flanges at least at the first end of the bracket body, the opposing flanges defining a mouth opening; and

receiving and securing a bumper beam in the mouth opening at the first end of bracket body.

39. The method of claim 38, further comprising attaching the second end of the bracket body to the motor vehicle.

40. The method of claim 38, further comprising attaching a pole impact protector to the bumper beam on an opposite side of the bumper beam from the bracket.

41. The method of claim 40, wherein the pole impact protector comprises a hollow body having a closed end and open end, the pole impact protector body further opposing flanges extending from the open end, wherein the step of attaching the pole impact protector to the bumper beam comprises receiving the bumper beam between the opposing flanges of the pole impact protector body and securing the flanges to the bumper beam.

42. A method of assembling and attaching a bumper system to a motor vehicle, comprising:

providing an energy-absorbing bracket comprising a hollow energy-absorbing body having a first end and a second end, the bracket comprising a hollow energy-absorbing body having a first end and a second end, the bracket body having a first cross sectional shape at the first end and transitioning to a second cross sectional shape at the second end, the bracket body further comprising opposing flanges at least at the first end of the bracket body, the opposing flanges defining a mouth opening; and

receiving and securing a bumper beam in the mouth opening at the first end of the bracket body.

43. The method of claim 42, further comprising attaching the second end of the bracket body to the motor vehicle.

44. The method of claim 42, further comprising attaching a pole impact protector to the bumper beam on an opposite side of the bumper beam from the bracket.

45. The method of claim 44, wherein the pole impact protector comprises a hollow body having a closed end and an open end, the pole impact protector body further

comprising opposing flanges extending from the open end, wherein the step of attaching the pole impact protector to the bumper beam comprises receiving the bumper beam between the opposing flanges of the pole impact protector body and securing the flanges to the bumper beam.